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Indian Standard

SPECIFICATION FOR ELECTRICAL RELAYS FOR POWER SYSTEM PROTECTION

PART 3 REQUIREMENTS FOR PARTICULAR GROUP OF RELAYS

Section 1 Non-Specified Time or Independent Specified Time Measuring Relays

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(*General*) — Substitute 'IS 3231 (Part 2/Sec 2) : 1987' *for* 'IS 3231 (Part2/ Sec 2) : 1986' wherever it appears.

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SPECIFICATION FOR ELECTRICAL RELAYS FOR POWER SYSTEM PROTECTION

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Section 1 Non-Specified Time or Independent Specified Time Measuring Relays

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SPECIFICATION FOR ELECTRICAL RELAYS FOR POWER SYSTEM PROTECTION

PART 3 REQUIREMENTS FOR PARTICULAR GROUP OF RELAYS

Section 1 Non-Specified Time or Independent Specified Time Measuring Relays

0. FOREWORD

0.1 This Indian Standard (Part 3/Sec 1) was adopted by the Indian Standards Institution on 14 January 1987, after the draft finalized by the Relays Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard is one of the series of standards being brought out to cover the requirements of protection relays. General introduction to this series is given in IS : 3231 (Part 0)-1986[*].

The standards published in the series so far are:

IS : 3231 Specification for electrical relays for power systems protection

(Part 0) - 1986	General introduction and list of parts (*first revision*)
(Part 1/Sec 1) - 1986	General requirements, Section 1 Contact performance (*first revision*)
(Part 1/Sec 2) - 1986	General requirements, Section 2 Insulation tests (*first revision*)
(Part 1/Sec 3) - 1986	General requirements, Section 3 High frequency disturbance test for static relays (*first revision*)
(Part 2/Sec 1) - 1987	Requirements for principal families, Section 1 All-or-nothing relays

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[*] Specification for electrical relays for power system protection: Part 0 General introduction and list of parts (*first revision*).

(Part 2/Sec 2) - 1987	Requirements for principal families, Section 2 General requirements for measuring relays
(Part 3/Sec 1) - 1987	Requirements for particular group of relays, Section 1 Non-specified time or independent specified time measuring relays
(Part 3/Sec 2) - 1987	Requirements for particular group of relays, Section 2 Dependent specified time measuring relays
(Part 3/Sec 3) - 1987	Requirements for particular group of relays, Section 3 Biased percentage differential relays

0.3 According to classification on hierarchical basis [*see* IS : 3231 (Part 0)-1986*], this standard is a third level document.

0.4 This standard is to be read in conjunction with IS : 3231 (Part 2/ Sec 2)-1986† to which it makes the reference and supplements where the special requirements for non-specified or independent specified time measuring relays make this necessary.

0.5 In preparing this standard, assistance has been derived from the following:

IEC Pub 255-3 (1971) Electrical relays, Part 3 Single input energizing quantity measuring relays with non-specified time or with independent specified time. International Electrotechnical Commission.

BS 142 : Section 3.1 : 1983 Electrical Protection Relays, Part 3 Requirements for single input energizing quantity relays, Section 3.1 Specification for single input energizing quantity measuring relays with non-specified time or with independent specified time. British Standards Institution.

1. SCOPE

1.1 This standard (Part 3/Sec 1) specifies the requirements for single input energizing quantity measuring relays with non-specified time or with independent specified time, as a particular sub-family of measuring relays whose general requirements are specified in IS : 3231 (Part 2/ Sec 2)-1986†.

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*Specification for electrical relays for power system protection: Part 0 General introduction and list of parts (*first revision*).

†Specification for electrical relays for power system protection: Part 2 Requirements for principal families, Section 2 General requirements for measuring relays.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 1885 (Part 9)-1986* shall apply.

3. STANDARD VALUES

3.1 Standard Reference Values of Influencing Quantities and Factors and Standard Values of their Nominal and Extreme Ranges

3.1.1 *Standard Reference Values of Influencing Quantities and Factors*

3.1.1.1 *Input energizing quantity* — The reference magnitude of the input energizing quantity (reference for the determination of variations) shall be as declared by the manufacturer selected from Table 1 of IS : 3231 (Part 2/Sec 2)-1986†.

3.1.2 *Standard Values of Limits of Nominal Ranges of Influencing Quantities and Factors*

3.1.2.1 *Input energizing quantities* — For independent specified time relays; the standard values of limits of the nominal range of input energizing quantity shall be the limits of the effective range, as declared by the manufacturer, selected from Table 2 of IS : 3231 (Part 2/Sec 2)-1986†.

4. VALUES OF LIMITS OF OPERATIVE RANGES OF AUXILIARY ENERGIZING QUANTITIES

4.1 The values of limits of operative ranges of auxiliary energizing quantities shall be as specified in **4** of IS : 3231 (Part 2/Sec 2)-1986†.

5. THERMAL REQUIREMENTS

5.1 Thermal requirements shall be as specified in **5** of IS : 3231 (Part 2/Sec 2)-1986†.

6. ACCURACY

6.1 The requirements relating to accuracy shall be in accordance with **6** of IS : 3231 (Part 2/Sec 2)-1986† and **6.2** of this standard.

6.2 For relays with an assigned error applicable to operating time, the maximum permissible error of the specified operating time shall be expressed as a percentage of the time setting value together with a fixed maximum time error (where this may exceed the percentage value), whichever is greater, for example, 5 percent or 20 ms.

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*Electrotechnical vocabulary: Part 9 Electrical relays (*first revision*).

†Specification for electrical relays for power system protection: Part 2 Requirements for principal families, Section 2 General requirements for measuring relays.

7. RATED BURDEN AND RATED IMPEDANCE

7.1 The requirements for rated burden and rated impedance shall be as specified in **8** of IS : 3231 (Part 2/Sec 2)-1986*.

8. MECHANICAL REQUIREMENTS

8.1 The mechanical requirements shall be as specified in **9** of IS : 3231-(Part 2/Sec 2)-1986*.

9. CONSTRUCTIONAL REQUIREMENTS

9.1 The constructional requirements shall be as specified in **10** of IS : 3231 (Part 2/Sec 2)-1986*.

10. CONTACT PERFORMANCE

10.1 Contact performance shall be in accordance with the requirements of IS : 3231 (Part 1/Sec 1)-1986†.

11. INSULATION REQUIREMENTS

11.1 Insulation requirements shall be in accordance with IS : 3231-(Part 1/Sec 2)-1986‡.

12. MARKING AND DATA

12.1 Marking and data shall be as specified in **11** of IS : 3231 (Part 2/Sec 2)-1986*.

13. THERMAL TESTS

13.1 Thermal tests shall be made in accordance with **13** of IS : 3231 (Part 2/Sec 2)-1986*.

14. MECHANICAL TESTS

14.1 The requirements of IS : 3231 (Part 2/Sec 2)-1986* shall apply subject to the modifications given in **14.2**.

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*Specification for electrical relays for power system protection: Part 2 Requirements for principal families, Section 2 General requirements for measuring relays.

†Specification for electrical relays for power system protection: Part 1 General requirements, Section 1 Contact performance.

‡Specification for electrical relays for power system protection: Part 1 General requirements, Section 2 Insulation tests.

14.2 Test Conditions — The values of the characteristic quantity o input energizing quantity for mechanical durability tests shall be a specified in Table 1. The transition from initial to final value shall b sudden, that is with the minimum of delay.

TABLE 1 VALUES OF CHARACTERISTIC QUANTITY OR INPUT ENERGIZING QUANTITY FOR MECHANICAL DURABILITY TEST

Type of Relay	Characteristic Quantity	
	Initial Value	Final Value
(1)	(2)	(3)
Maximum voltage relay	0	110 percent of the operating value
Maximum current relay	0	200 percent of the operating value
Minimum voltage or current relay	Rated value ±5 percent	0
Frequency relay (minimum and/ or maximum	Not specified	Not specified

15. ACCURACY TESTS

15.1 Method of Determining Errors Related to the Specified Time

15.1.1 *Test Conditions Relating to the Characteristic Quantity* — The test conditions relating to the characteristic quantity shall be as specified in Table 2.

TABLE 2 TEST CONDITIONS RELATING TO THE CHARACTERISTIC QUANTITY FOR DETERMINING ERRORS RELATING TO THE SPECIFIED TIME

Type of Relay	Characteristic Quantity	
	Initial Value	Final Value
(1)	(2)	(3)
Maximum voltage relay	0	110 percent of the operating voltage
Maximum current relay	0	To be declared by the manufacturer
Maximum voltage or current relay	Rated value	80 percent of the operating value
Frequency relay (minimum and/or maximum) (*see* **15.1.1.1**)	Rated value	To be declared by the manufacturer

15.1.1.1 For frequency relays, the initial value shall have its rated alue ±5 percent.

15.1.1.2 Tests shall be made at both limits of the range of haracteristic quantity within which the manufacturer has declared the elay to have an independent specified time.

15.1.1.3 The transition between initial value and final value shall be with the minimum of delay.

15.1.2 *Test Conditions Relating to the Auxiliary Energizing Quantities* — The manufacturer shall declare whether the initial values of he auxiliary energizing quantities are rated values or zero. For determination of errors relating to the specified time, the final values shall be zero or the rated values as declared by the manufacturer.

15.2 Method of Determining the Errors and Variations Relating to the Characteristic Quantity — The method of application of the characteristic quantity (for example, suddenly or gradually) and the requirements relating to the dc component in ac shall be declared by the manufacturer.

15.3 Method of Determining the Variations Relating to the Specified Time

15.3.1 The characteristic quantity shall be applied as given in **15.1.1.3.**

15.3.2 The manufacturer shall declare, whether the initial value of the auxiliary energizing quantity is the rated value or zero. The final value of the auxiliary energizing quantity shall be zero or any value within the nominal range of the auxiliary energizing quantity.

16. TEST CONDITIONS FOR MEASUREMENT OF OVERSHOOT

16.1 During tests for the measurement of overshoot, the initial and final values of the characteristic quantity shall be as specified in Table 3.

TABLE 3 INITIAL AND FINAL VALUES OF CHARACTERISTIC QUANTITY FOR MEASUREMENT OF OVERSHOOT

Type of Relay	Characteristic Quantity	
	Initial Value	Final Value
(1)	(2)	(3)
Maximum measuring relays	Upper limit of effective range	0
Minimum measuring relays	Lower limit of effective range	Rated value

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